WHAT IS CLAIMED IS:

1. A lithographic projection apparatus comprising:

a radiation system, comprising a radiation source, and an illumination system that supplies a beam of radiation;

a support structure that supports a patterning structure, the patterning structure configured to pattern the beam of radiation according to a desired pattern;

a substrate support that supports a substrate;

a projection system that projects the patterned beam onto a target portion of the substrate;

an electrode; and

a voltage source that applies an electric field between the radiation source and the electrode to generate a discharge between the radiation source and the electrode.

2. The apparatus according to claim 1, wherein the electrode is positioned in the beam of radiation.

3. The apparatus according to claim 1, further comprising a contaminant barrier disposed downstream, relative to the direction of propagation of the beam of radiation, of said radiation source.

4. The apparatus according to claim 1, wherein said electrode is a contaminant barrier disposed downstream, relative to the direction of propagation of the beam of radiation, of said radiation source.

5. The apparatus according to claim 1, wherein said electrode is a cathode.

6. The apparatus according to claim 5, wherein the cathode is a hollow cathode.

7. The apparatus according to claim 1, wherein said voltage source is arranged to generate a DC field.

8. The apparatus according to claim 1, wherein said voltage source is arranged to generate a square-wave modulated electric field that is synchronized with the radiation source.

9. The apparatus according to claim 1, wherein a magnetic field generator is provided to apply an axial magnetic field between said radiation source and said electrode.

10. The apparatus according to claim 1, wherein a gas is provided in a region traversed by said beam of radiation.

11. The apparatus according to claim 10, wherein the gas comprises an extreme ultra-violet transparent gas.

12. The apparatus according to claim 11, wherein the extreme ultra-violet transparent gas comprises at least one of He, Ar, N_2, and H_2.

13. The apparatus according to claim 10, further comprising a gas supply unit constructed and arranged to provide said gas in said region traversed by the projection beam.

14. The apparatus according to claim 13, further comprising an outlet positioned upstream, relative to the direction of propagation of the beam of radiation, of the gas supply unit to remove said gas from said region traversed by said beam of radiation, and to create a gas flow being substantially directed in an opposite direction to a direction of propagation of contaminant particles.

15. The apparatus according to claim 1, comprising a laser-produced, or discharge, plasma radiation source.

16. The apparatus according to claim 1, wherein said beam of radiation comprises a wavelength of about 157 nm or about 126 nm.

17. The apparatus according to claim 1, wherein said beam of radiation comprises a wavelength from about 8 nm to about 20 nm.

18. The apparatus according to claim 17, wherein said beam of radiation comprises a wavelength from about 9 nm to about 16 nm.

19. A radiation system, comprising:

a radiation source;

an electrode; and

a voltage source,

wherein the voltage source applies an electric field between the radiation source and the electrode, and generates a discharge between the radiation source and the electrode to capture contaminant particles from said radiation source.

20. The radiation system according to claim 19, further comprising a contaminant barrier.

21. A device manufacturing method using a lithography apparatus, the method comprising:

providing a beam of radiation with a radiation source;

patterning the beam of radiation;

projecting the patterned beam onto a target portion of a substrate;

providing an electrode positioned downstream, relative to a direction of propagation of the beam of radiation, of the radiation source; and

applying an electric field between the radiation source and the electrode to generate a discharge between the radiation source and the electrode.

22. The method according to claim 21, wherein the electric field is a DC field.

23. The method according to claim 21, wherein the electric field is square-wave modulated and synchronized with the radiation system.

24. The method according to claim 21, wherein the electrode is a contaminant barrier.

25. The method according to claims 21, wherein the electric field between the radiation source and the electrode has a voltage difference up to about 1000 V.

26. The method according to claim 21, further comprising providing a gas in the region between the radiation source and the electrode.

27. A method for debris suppression of an ionizing radiation system, comprising:

providing a radiation source;

providing an electrode; and

applying an electric field between the radiation source and the electrode generate a discharge between the radiation source and the electrode.

28. A device manufactured by the apparatus according to claim 1.

29. A device manufactured by the method according to claim 21.